

User-Centered Design and Development

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Copyright Notice

- These slides are a revised version of the originals provided with the book “Interaction Design” by Jennifer Preece, Yvonne Rogers, and Helen Sharp, Wiley, 2002.
- I added some material, made some minor modifications, and created a custom show to select a subset.
 - Slides added or modified by me are marked with my initials (FJK), unless I forgot it ...

484-W09 Quarter

- The slides I use in class are in the Custom Show “484-W09”. It is a subset of the whole collection in this file.
- Week 4 contains slides from Chapters 6 and 7 of the textbook.
- The original slides are a bit of a mess, and I cleaned up various issues
 - outline view didn’t show body text
 - quite a bit of “manual” formatting instead of styles (bulleted/numbered lists)

Chapter 6

The Process of Interaction Design

Chapter Overview

- Interaction Design Activities
- Key Characteristics of the Interaction Design Process
- Users and User Needs
- Alternative Designs
- Life Cycle Models

Motivation

- it is helpful to know about common basic activities in interaction design, and key characteristics of the design process
- interaction design should be driven by the needs of the users
- alternative designs can provide options for users, designers, and developers
- lifecycle models for interaction design have been derived from similar ones used in software engineering and HCI

Objectives

- know about the basic activities and key characteristics of the interaction design process
- be aware of different types of users and shareholders, and their potential influence on the design
- be familiar with some strategies to generate alternative designs
- know the main differences between SE/HCI life cycle models and one for interaction design

The Process of Interaction Design



Overview

- What is Interaction Design?
 - Four basic activities
 - Three key characteristics
- Some practical issues
 - Who are the users?
 - What are 'needs'?
 - Where do alternatives come from?
 - How do you choose among alternatives?
- Lifecycle models from software engineering
- Lifecycle models from HCI



What is Interaction Design?

- It is a process:
 - a goal-directed problem solving activity informed by intended use, target domain, materials, cost, and feasibility
 - a creative activity
 - a decision-making activity to balance trade-offs
- It is a representation:
 - a plan for development
 - a set of alternatives and successive elaborations

Four Basic Activities

- Identifying *needs* and establishing *requirements*
- Developing *alternative designs*
- Building *interactive versions* of the designs
 - prototypes
- *Evaluating designs*

Three Key Characteristics

Three key characteristics permeate these four activities:

1. Focus on *users early* in the design and evaluation of the artefact
2. Identify, document and agree specific *usability* and *user experience goals*
3. *Iteration* is inevitable. Designers never get it right first time

Some Practical Issues

- Who are the users?
- What are 'needs'?
- Where do alternatives come from?
- How do you choose among alternatives?

Who are the Users and Stakeholders?

- Not as obvious as one may think:
 - those who interact directly with the product
 - those who manage direct users
 - those who receive output from the product
 - those who make the purchasing decision
 - those who use competitor's products

Three Categories of Users

- primary: frequent hands-on
- secondary: occasional or via someone else
- tertiary: affected by its introduction, or will influence its purchase

(Eason, 1987)

Who are the stakeholders?

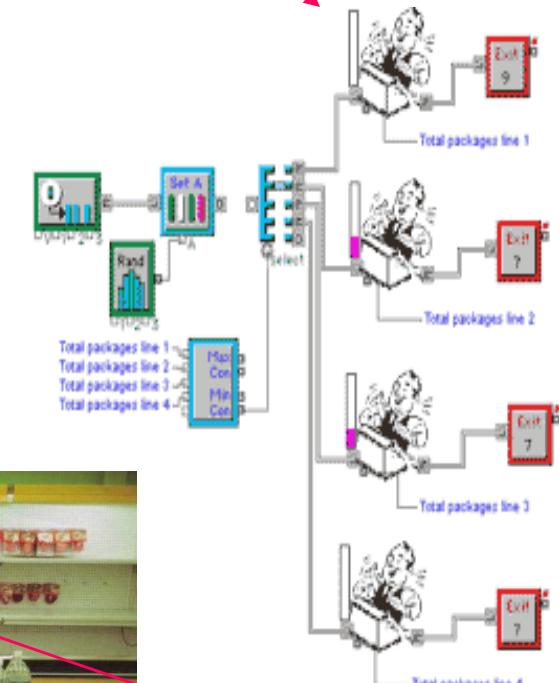
- Suppliers
- Local shop owners



Managers and owners



Check-out operators



Customers

Users' Capabilities

- Humans vary in many dimensions:
 - size of hands may affect the size and positioning of input buttons
 - motor abilities may affect the suitability of certain input and output devices
 - height if designing a physical kiosk
 - strength - a child's toy requires little strength to operate, but greater strength to change batteries
 - disabilities(e.g. sight, hearing, dexterity)



User Needs

- Users rarely know what is possible
- Users may not know their 'needs'
 - to help them achieve their goals
- Existing tasks:
 - their context
 - what information do they require?
 - who collaborates to achieve the task?
 - why is the task achieved the way it is?
- Envisioned tasks:
 - can be rooted in existing behaviour
 - can be described as future scenarios

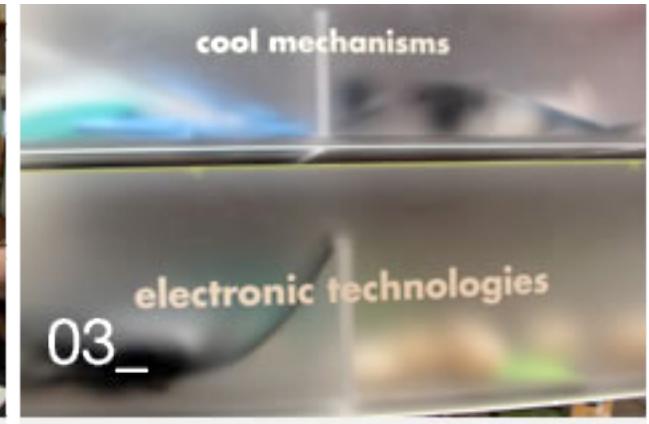
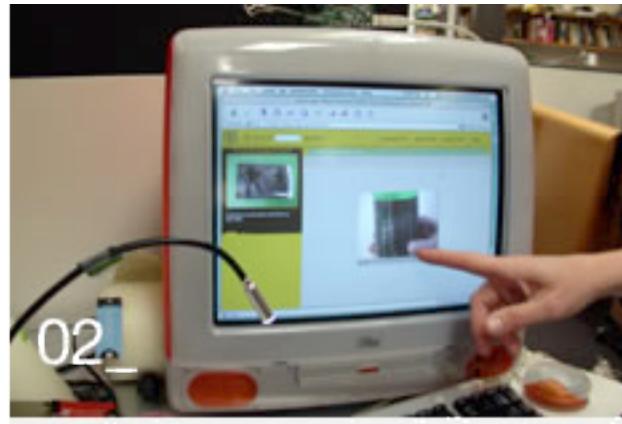


Design Alternatives

- Humans stick to what they know works
- But considering alternatives is important to 'break out of the box'
- Designers are trained to consider alternatives, software people generally are not
- How do you generate alternatives?
 - 'Flair and creativity': research and synthesis
 - Seek inspiration: look at similar products or look at very different products

IDEO TechBox

- Library, database, website - all-in-one
- Contains physical gizmos for inspiration



From: www.ideo.com/

The TechBox



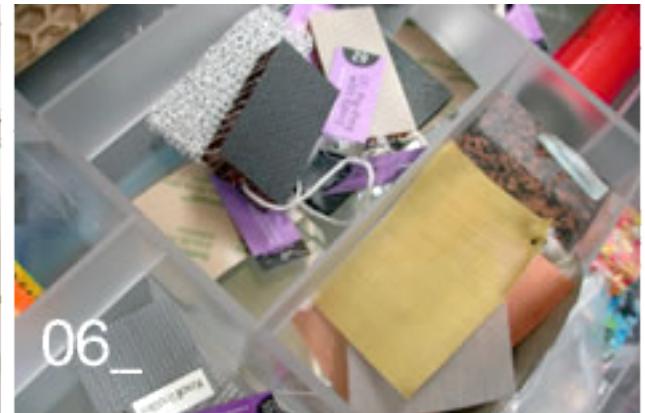
04_

Each drawer resembles a bento box



05_

The curator keeps order



06_

All the entries are tagged



07_

It really is used daily



08_

Two demonstrations units on top

Choosing among Alternatives

- Evaluation with users or with peers
 - prototypes
- Technical feasibility
 - some alternatives are not possible/economical
- Quality thresholds:
 - Usability goals lead to usability criteria set early on and check regularly
 - safety: how safe?
 - utility: which functions are superfluous?
 - effectiveness: appropriate support, task coverage, information available
 - efficiency: performance measurements

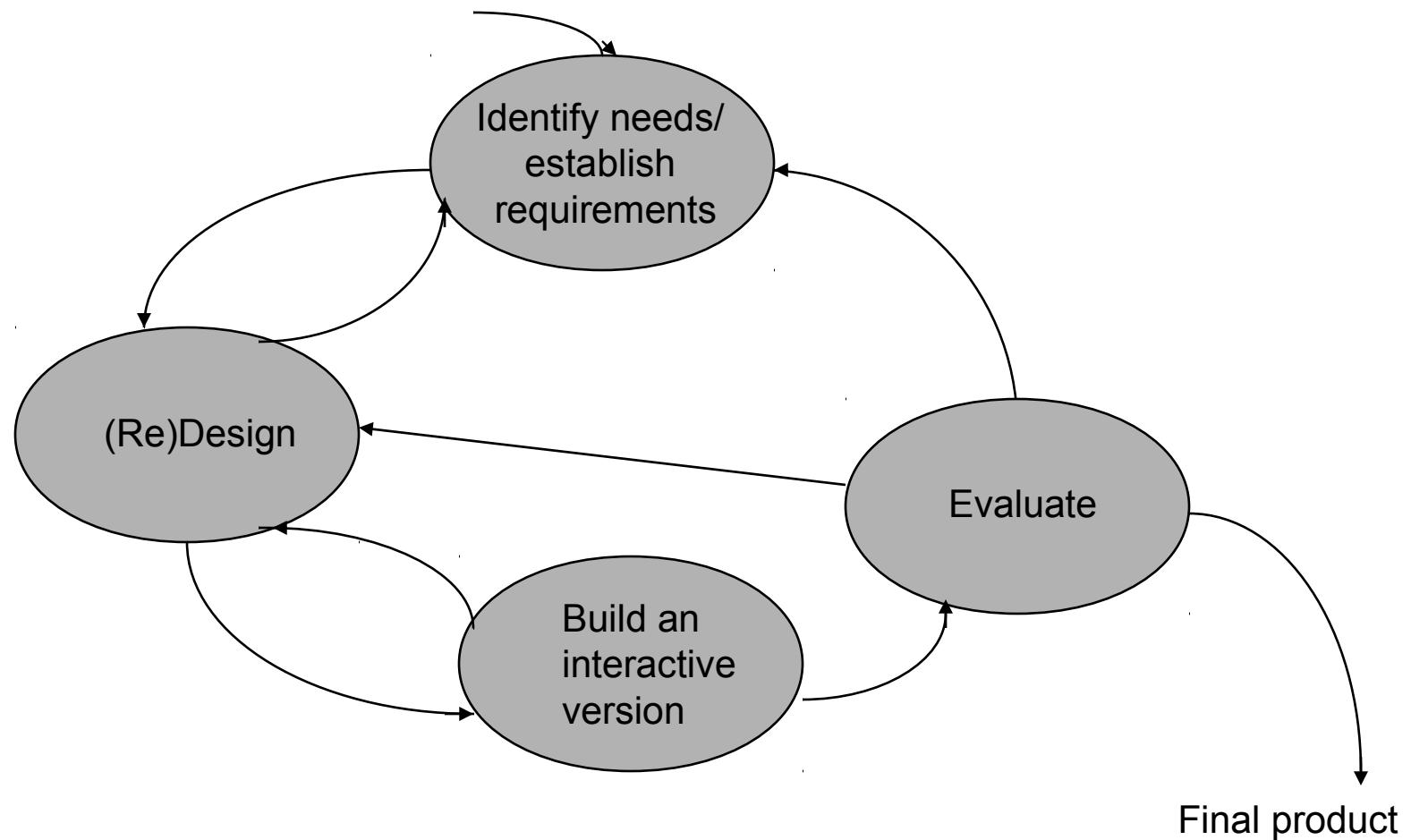
Testing Prototypes to choose among Alternatives



Lifecycle Models

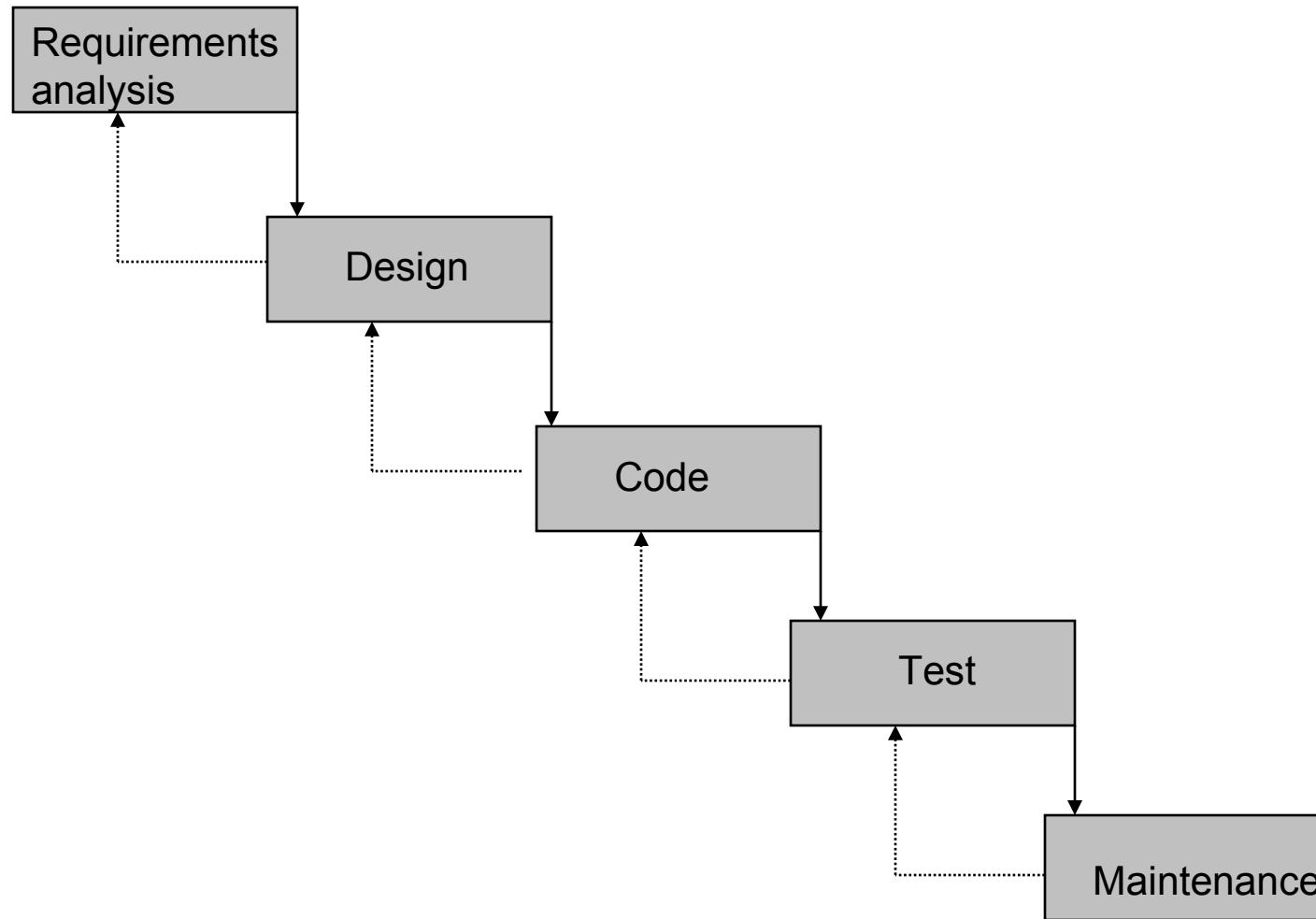
- Show how activities are related to each other
- Lifecycle models are:
 - management tools
 - simplified versions of reality
- Many lifecycle models exist, for example:
 - from software engineering: waterfall, spiral, JAD/RAD, Microsoft
 - from HCI: Star, usability engineering

A Simple Interaction Design Model

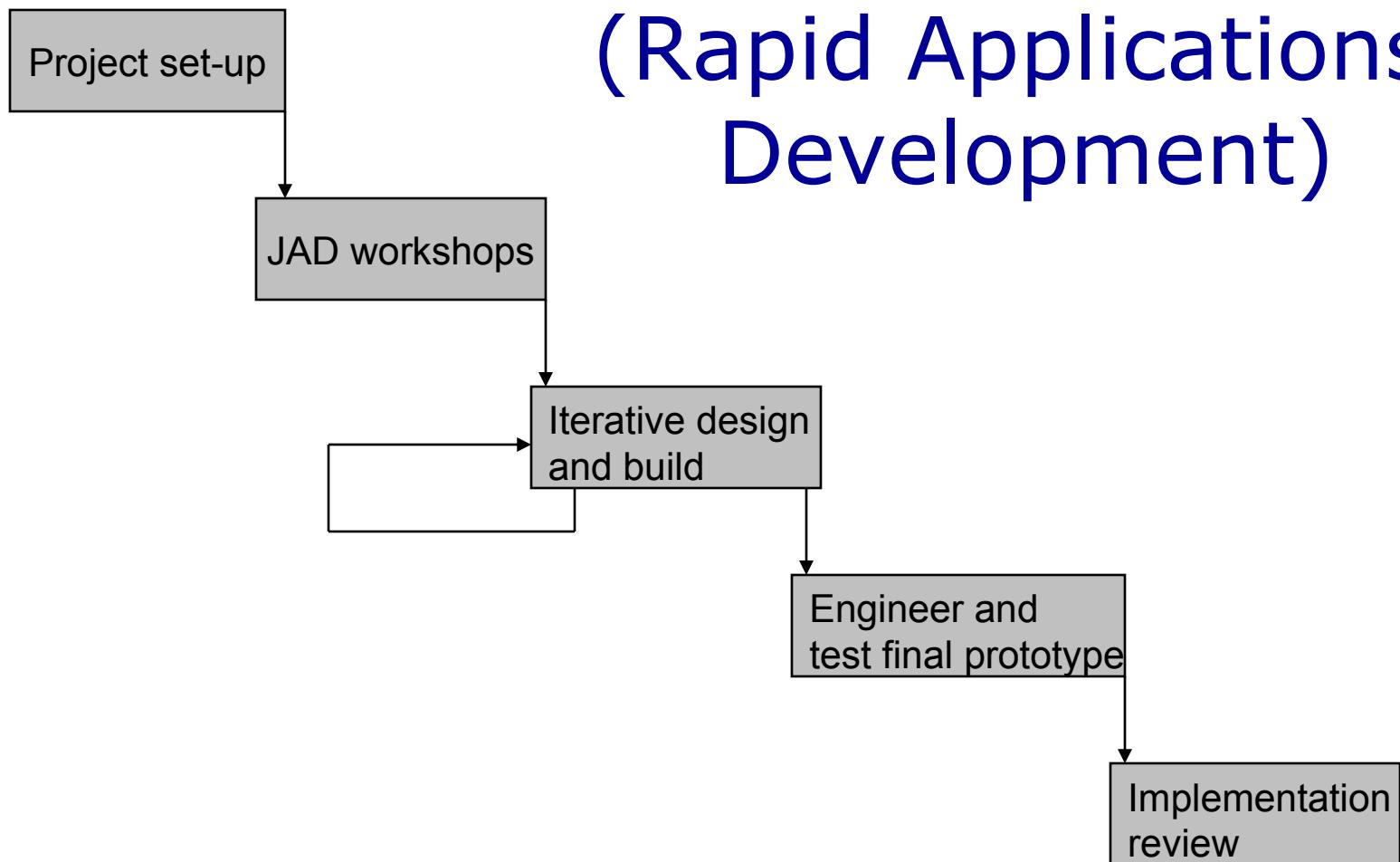


Exemplifies a user-centered design approach

Traditional ‘Waterfall’ Lifecycle



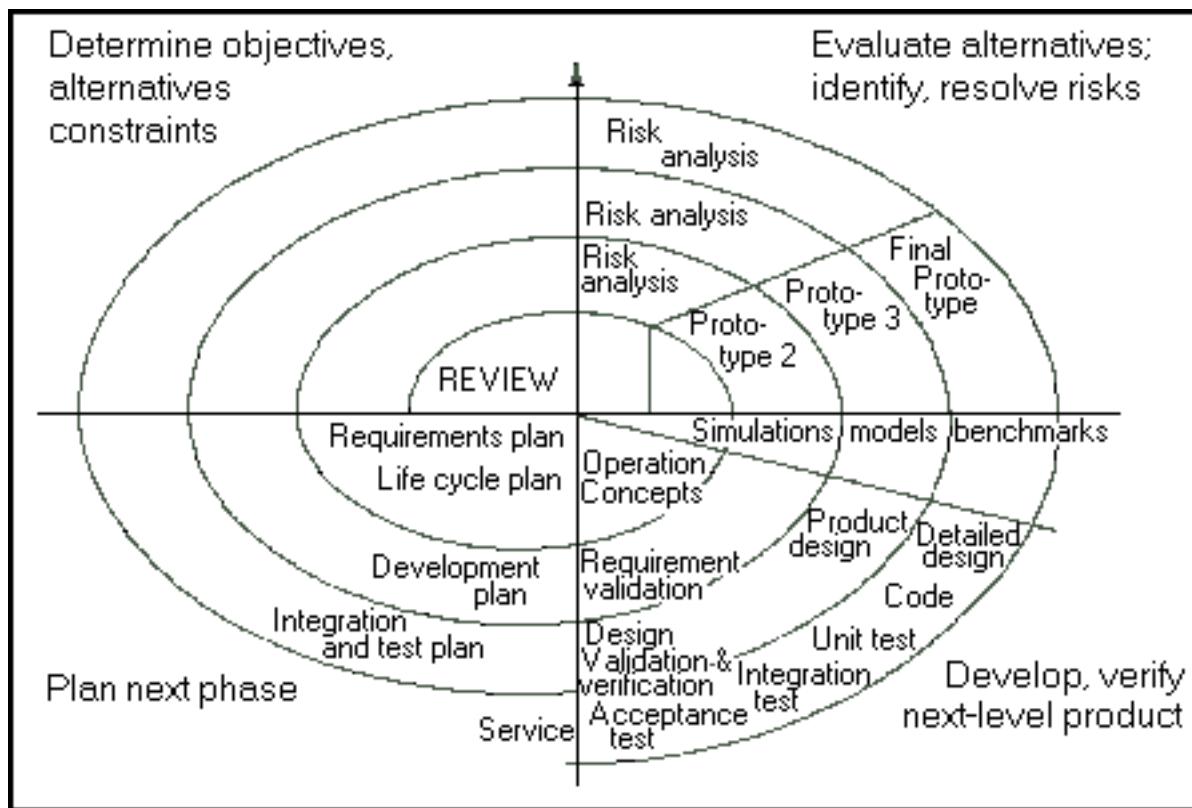
A Lifecycle for RAD (Rapid Applications Development)



Spiral Model (Barry Boehm)

- Important features:
 - Risk analysis
 - Prototyping
 - Iterative framework allowing ideas to be checked and evaluated
 - Explicitly encourages alternatives to be considered
- Good for large and complex projects but not simple ones
 - significant overhead

Spiral Lifecycle Model

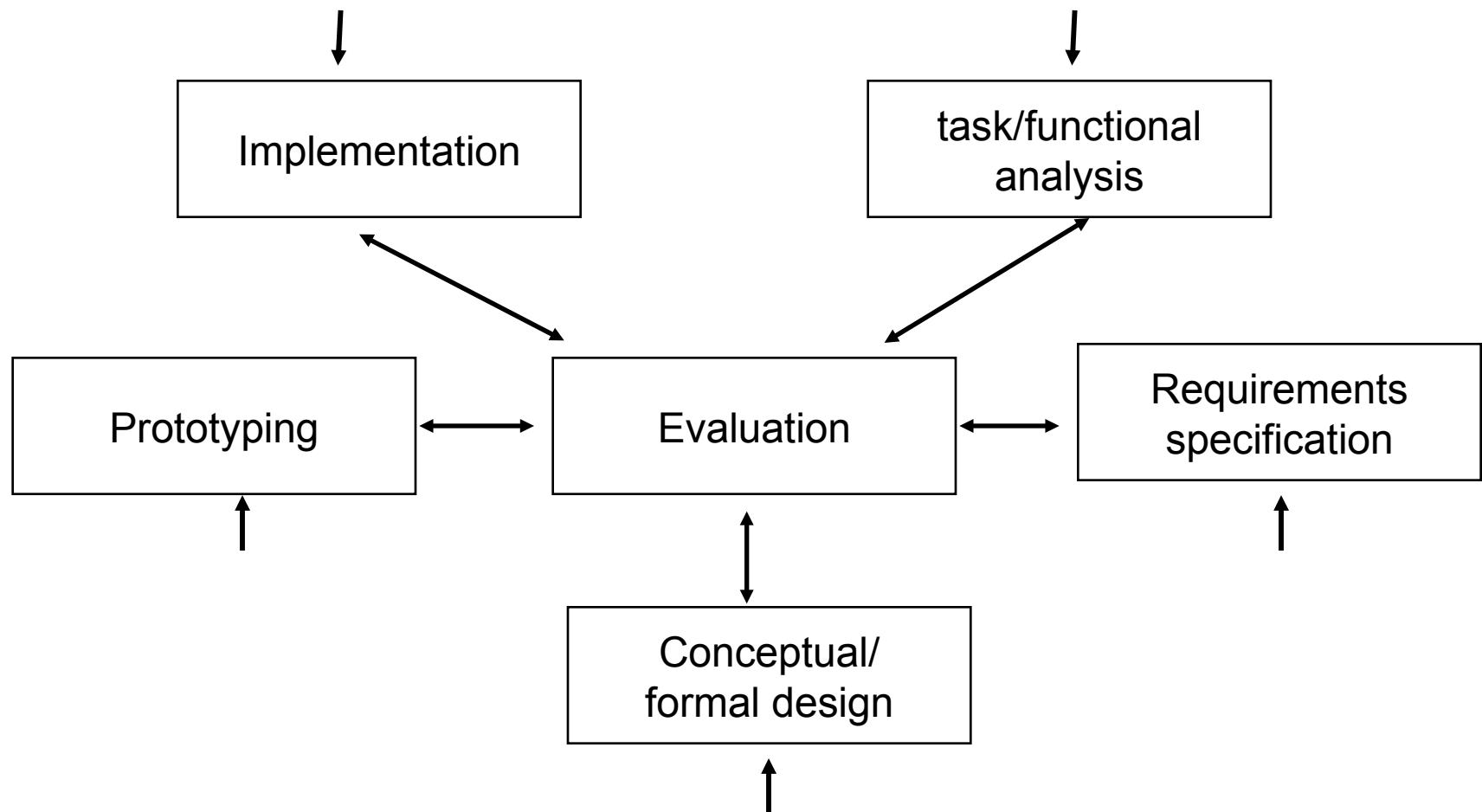


From cctr.umkc.edu/~kennethjuwng/spiral.htm

The Star Lifecycle Model

- Important features:
 - Evaluation at the center of activities
 - No particular ordering of activities.
Development may start in any one
 - Derived from empirical studies of
interface designers
- Suggested by Hartson and Hix (1989)

The Star Model (Hartson and Hix, 1989)



Usability Engineering Lifecycle Model

- Important features:
 - Holistic view of usability engineering
 - Provides links to software engineering approaches, e.g. OOSE
 - Stages of identifying requirements, designing, evaluating, prototyping
 - Can be scaled down for small projects
 - Uses a style guide to capture a set of usability goals
- Reported by Deborah Mayhew

Summary

- Four basic activities in the design process
 - Identify needs and establish requirements
 - Develop alternative designs
 - Building prototypes
 - Evaluating alternatives
- Three characteristics
 - Involve users early in the design and evaluation of the artefact
 - Define quantifiable & measurable usability criteria
 - Iteration is inevitable
- Lifecycle models show how these are related